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RULES OF PERSPECTIVE.

EXPLAINED, ILLUSTRATED, AND ADAPTED
TO PRACTICAL USE.

BY

M. M. RUNCIMAN.

WITH LETTER OF APPROVAL
FROM
PROFESSOR JOHN RUSKIN, M.A., HON. LL.D., &c. &c.

SECOND EDITION.

Ars probat artificem.

LONDON:
WINSOR & NEWTON, LIMITED, 38, RATHBONE PLACE, W.

Owing to the difficulties in binding, the Vanishing and Station Points on the folding plates may not be found accurately true; but the letterpress fully explains all that is necessary.

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4th June 84

Dear Mr Runciman

I assure you it gave me true pleasure to see your writing again; and to learn that you had made the alterations suggested in the arrangement of your Father's rules, — before not wholly clear. Your having done so enables me at once to guarantee the scientific accuracy and easy applicability of the rules; and with the greater security because I myself learned all the perspective from them which I ever apply to landscape practice.

Believe me always
Your faithful Servt

John Ruskin

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PREFACE.

It has always seemed to me that Perspective, to beginners, is so difficult to understand, that the amateur either lays it aside in despair, or, what is worse, tries to draw by eye what was never correctly done but by rule.

I have therefore explained, and illustrated, as simply as possible, the following Rules, taught by my father, Charles Runciman, who was Mr. Ruskin's first drawing master.

They are all the artist will find necessary for interior, or landscape drawing, to which Mr. Ruskin has kindly affixed his Certificate of their rightness.

Mercy M. Runciman.

49, Acacia Road,
St. John's Wood, N.W.

Example 1.—DIRECTIONS FOR DRAWING A CUBICAL BOX.

Draw the nearest, or most important, perpendicular line.

By its length determine the relative height of the eye, by holding the ruler even with the eyes, and finding (as an approximation) how many of these lines continued upwards it will take to give the height of the eye.

Draw the horizontal line at the height of the eye.

Place on the horizontal line your point of sight, *always in the centre of your picture.*

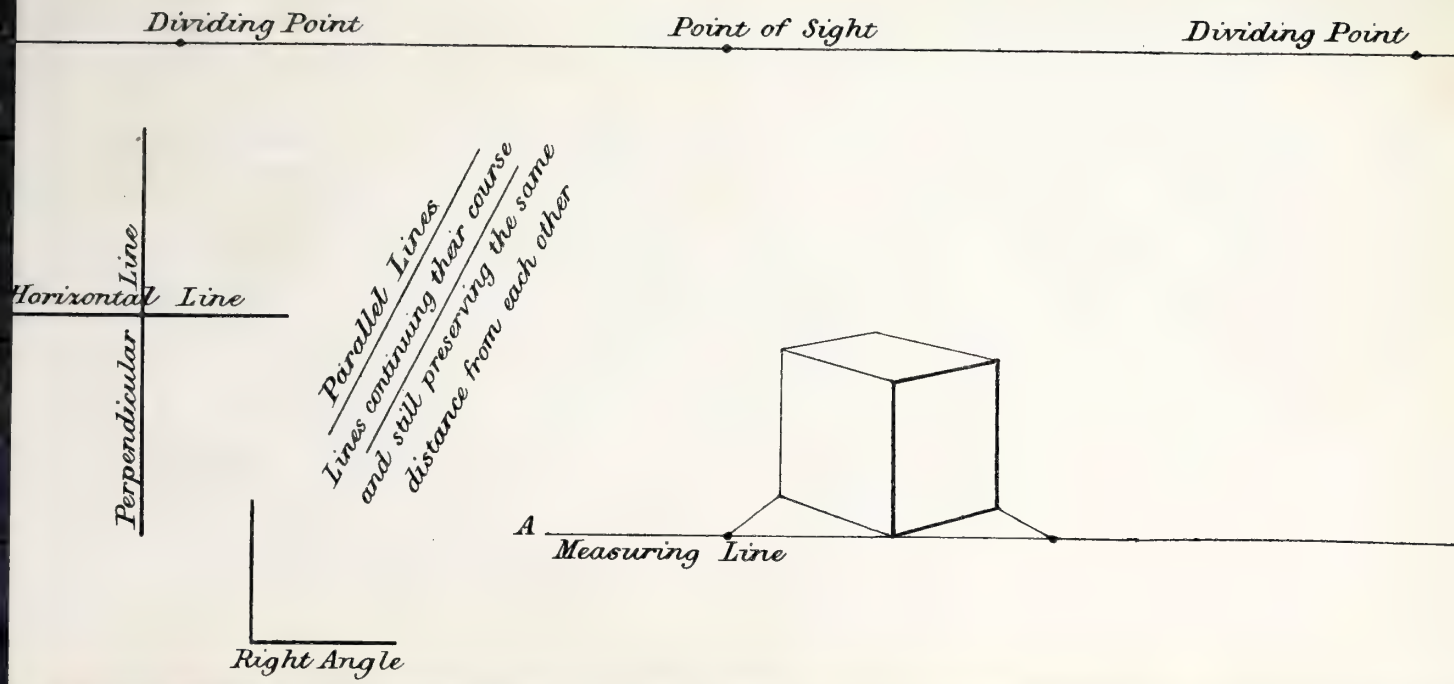
Fix the station point, which must be under the point of sight, and removed from it a distance equal to the length of the picture.

Find your vanishing points by placing your ruler at your station point, parallel with one side of your box, until the ruler intersects the horizontal line, which determines the first vanishing point: the second is obtained by taking a right angle at the station point, until the ruler intersects the horizontal line, which will give the second vanishing point.

For the length of the lines forming the sides of the box, draw a measuring line, as by Example A: mark on it the proportions required.

Find the dividing point, by placing the ruler at the vanishing point, and measuring the distance from it to the station point, and laying that distance on the horizontal line, measured from the vanishing point. The same rule applies to both sides of the box.

EXAMPLE I.


Dividing Point
Point of Sight
Dividing Point
Horizontal Line
Perpendicular Line
Parallel Lines
Lines continuing their course
and still preserving the same
distance from each other
A
Measuring Line
Right Angle

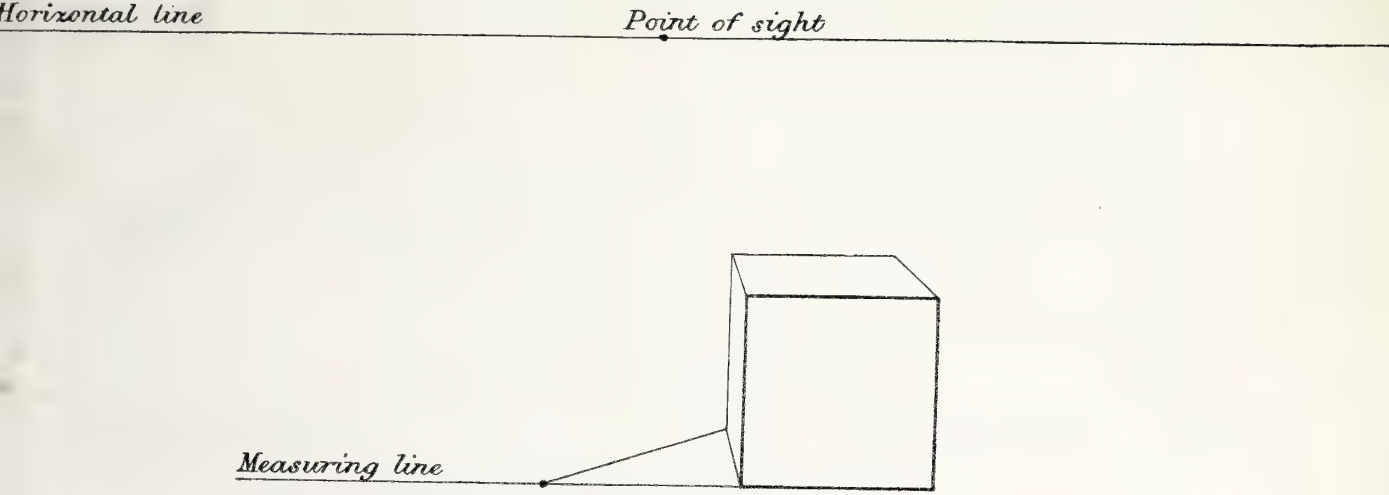
Example 2.—FOR DRAWING A CUBICAL BOX IN PARALLEL PERSPECTIVE.

Draw the size of the box required, find the height of the eye, the horizontal line, point of sight (*always in the centre of the picture*), and station point, as by Example 1.

All lines parallel to each other in nature must be drawn to the same vanishing point.

In parallel perspective the point of sight becomes the vanishing point: as by Example 2. The measuring line and dividing point must be used to give the length of the lines in perspective. In sketching from nature, the simplest cottage cannot be drawn without the rules given in Examples 1 and 2. And although the artist may say that ruler and compasses are a great incumbrance, still, the knowledge of how to apply the rules will give a more truthful result even without the ruler: a long slip of paper will be found to make a fair substitute. First, then, the size of your picture must be determined, placing the horizontal line at the height

EXAMPLE 2.

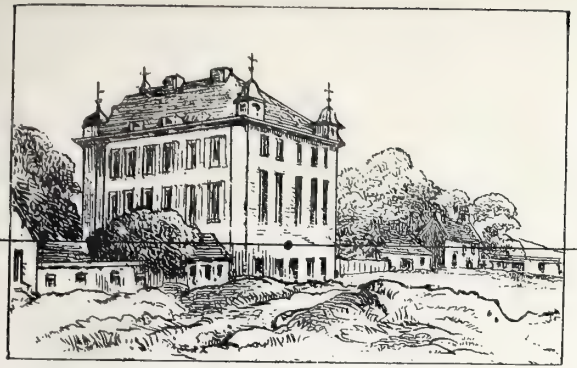


of the eye (on level ground) about a third of the height of your picture. If standing on high ground, the horizontal line will be higher accordingly. Place your point of sight in the middle of your picture and on the horizontal line, your station point under it, a distance equal to the length of the picture. If your ruler be placed at the station point, parallel (or even with) one side of the building you wish to draw in perspective, then a right angle at the station point will give the other vanishing point on the horizontal line.

Draw in your building by the vanishing points, as by Example 3, remembering that all lines parallel will vanish to the same point.

EXAMPLE 4—Gives an Illustration of Parallel Perspective.

EXAMPLE 3.



Vanishing Point
Example 3.

Horizontal Line
Example 4

EXAMPLE 4.

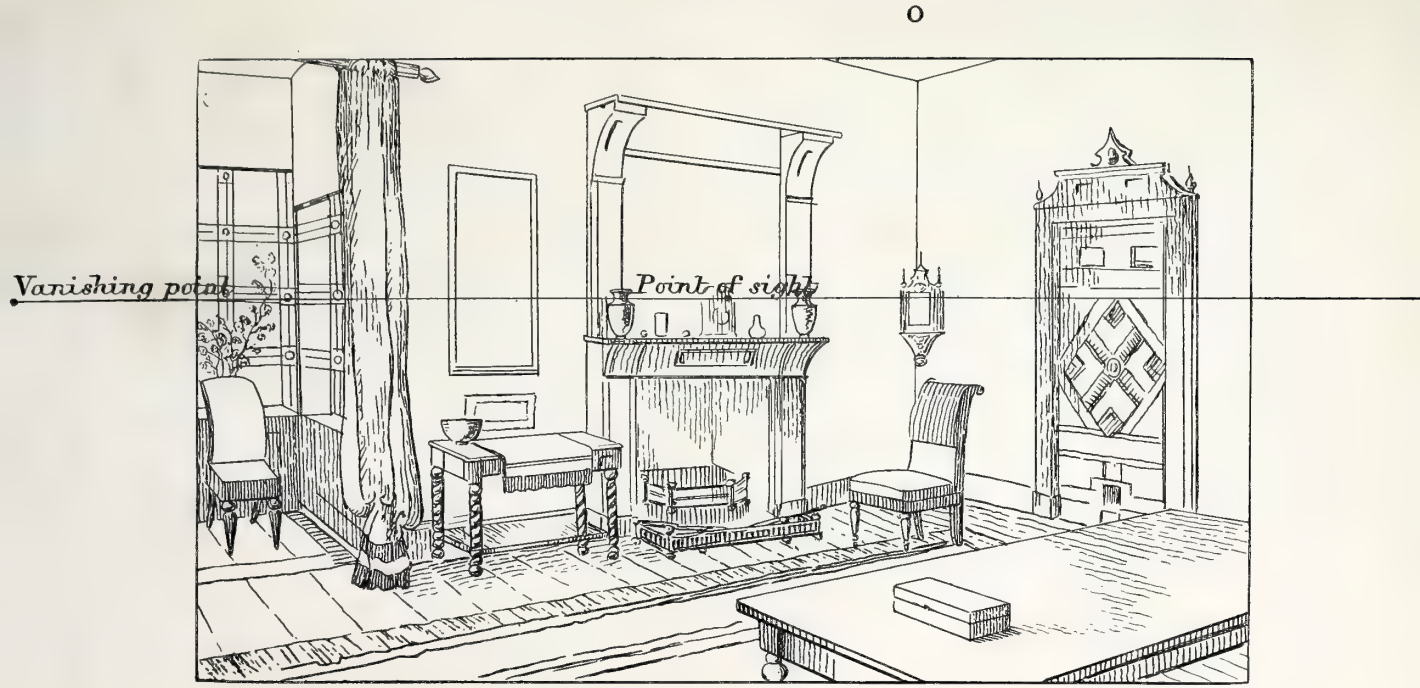
In Parallel Perspective, the point of sight becomes the vanishing point to which both sides of the building are drawn.

Station Point

Example 5.—AN INTERIOR, DRAWN IN PERSPECTIVE.

Drawing an interior by perspective is often thought very difficult; but the simple rule used in drawing a cubical box (Example 1) is all that is necessary. First, as in the case of the box, draw the most important perpendicular line, say the corner of the room you wish to sketch (O), which had better not be in the centre of your paper, as, artistically, it is most agreeable to the eye that the sides of the room should not be equal in length. By its length determine the height of the eye. Place your horizontal line at the height of your eye, and on it the point of sight in the centre of your picture, your station point under it, a distance equal to the length of the picture. Put your ruler at the station point, parallel (or even with) one side of the room, and where your ruler intersects the horizontal line decides the first vanishing point; the second is obtained by taking a right angle at the station point until the ruler intersects the horizontal line, which will give the second vanishing point. Draw in your room, using the two vanishing points, as by Example 5.

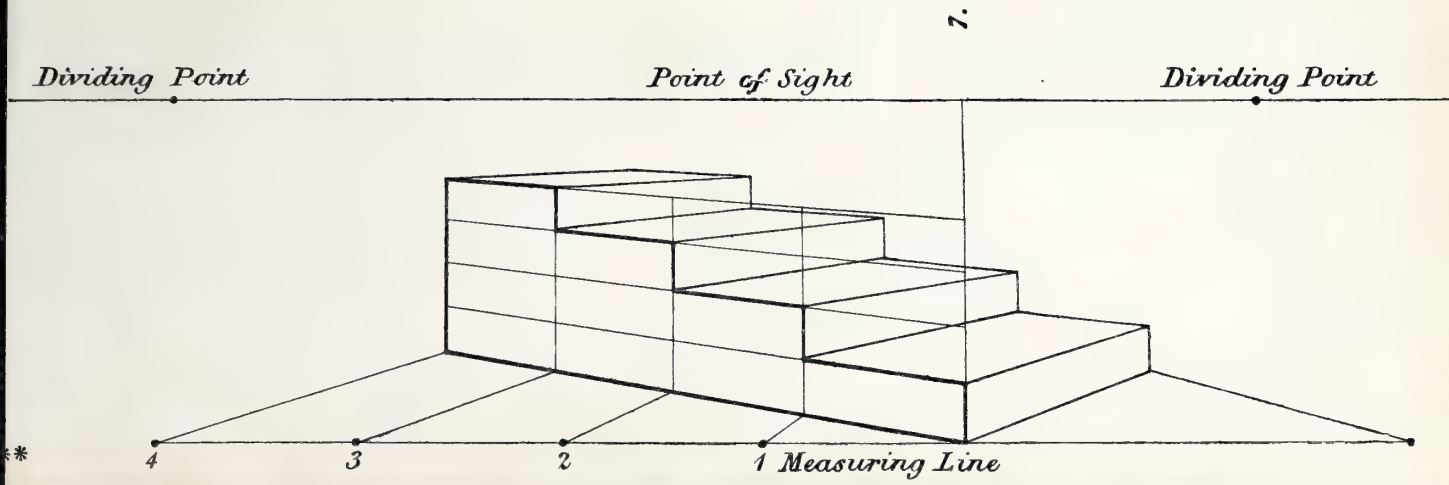
EXAMPLE 5.



Example 6.—STEPS, IN PERSPECTIVE.

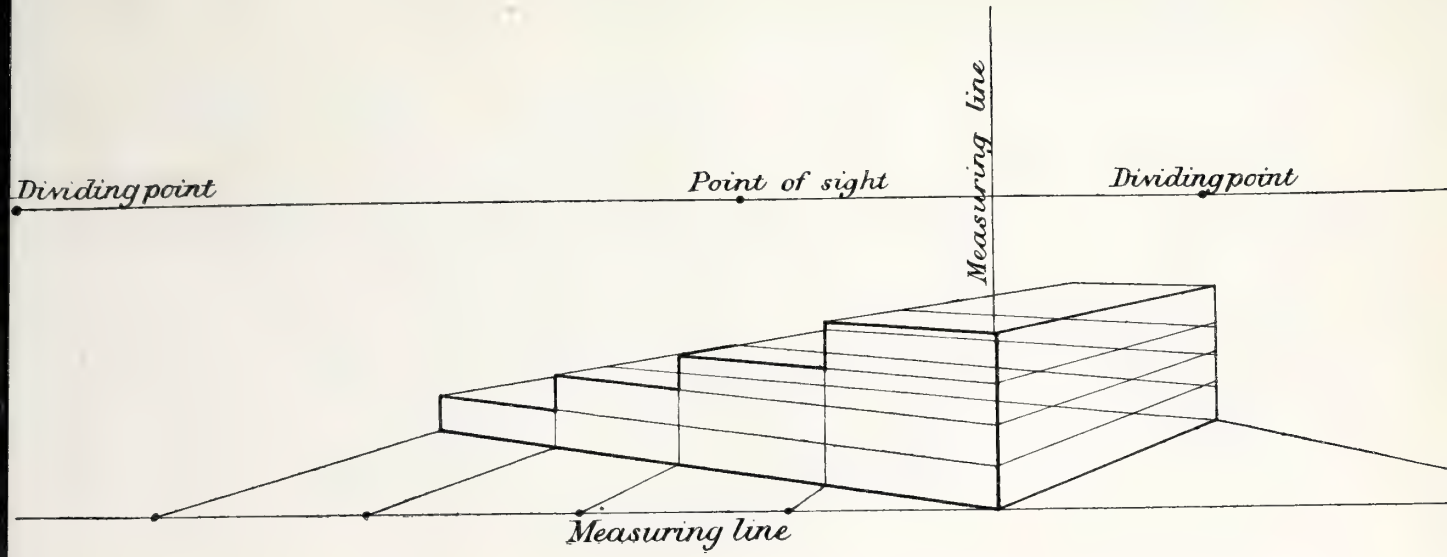
The same rule as in drawing a cubical box (Example 1) again applies. First, the nearest perpendicular line must be drawn, by its length the height of the eye determined, the horizontal line—at the height of the eye, point of sight, station point, and vanishing points. Draw a horizontal measuring line at the base of the nearest perpendicular line, as by Example 6. Find your dividing points by measuring the distance from the vanishing point to the station point, and laying that distance on the horizontal line, measured from the vanishing point. Then decide how many steps you wish to draw; if four, divide your measuring line into four equal parts, and by using your dividing points, carry the size of each step back to the block as by 1, 2, 3, 4, which will give the true size of each step in perspective. Then continue the nearest perpendicular line, so as to form a perpendicular measuring line, as by 7; mark on it the height of each step, and draw your steps in, using the two vanishing points as in Example 6.

EXAMPLE 6.


7.
Dividing Point
Point of Sight
Dividing Point
4
3
2
1 Measuring Line

EXAMPLE 7.—DRAWN BY THE SAME RULE AS EXAMPLE 6.

EXAMPLE 7.

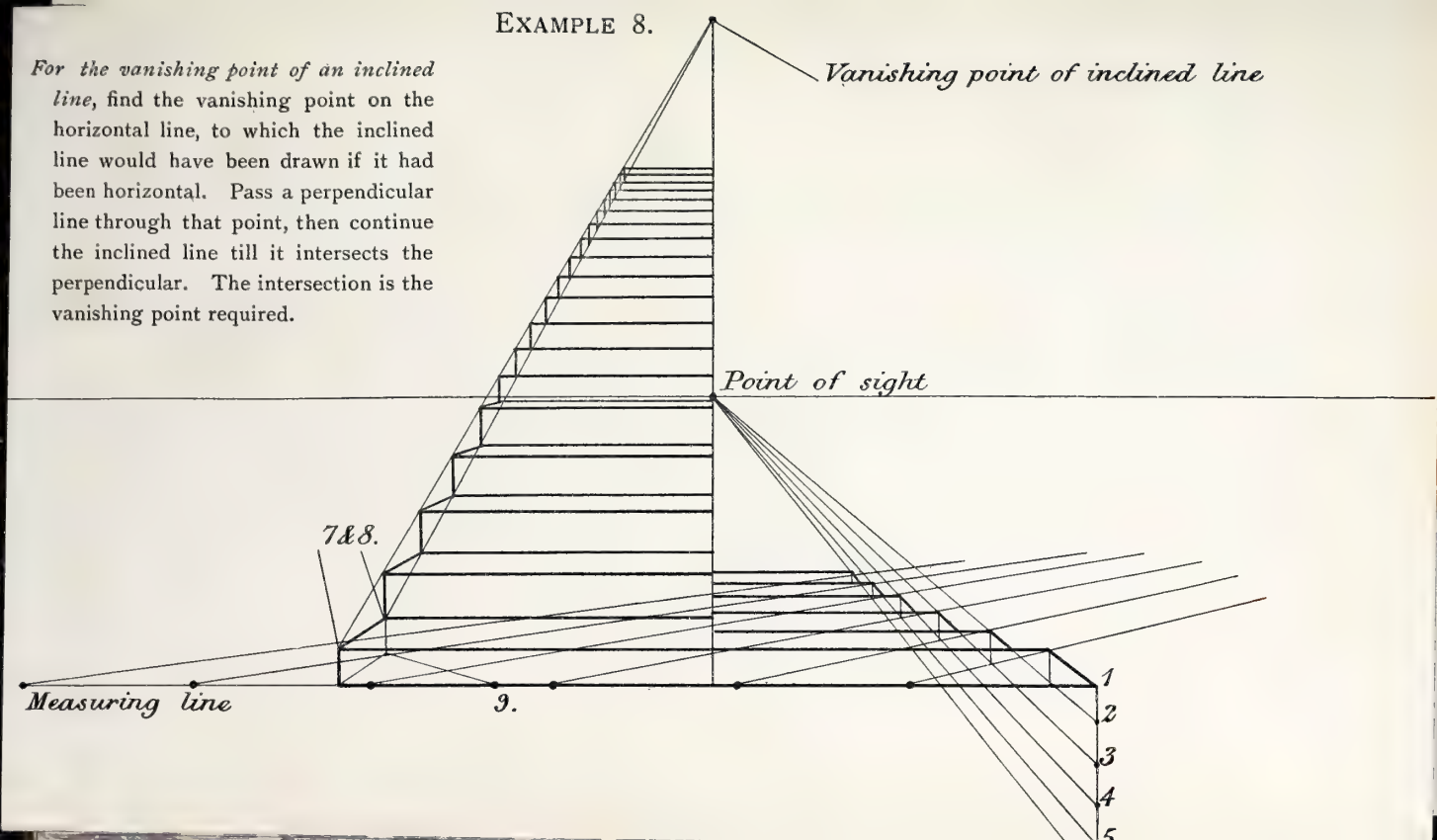

Dividing point
Point of sight
Measuring line
Dividing point
Measuring line

Example 8.—TO DRAW STAIRS, UP AND DOWN, IN PARALLEL PERSPECTIVE.

Decide the size of your picture, the height of your eye, the horizontal line, point of sight, station point, and vanishing point. The stairs being in parallel perspective, the point of sight becomes the vanishing point. Draw your first step the length and width you wish it: the length in parallel perspective is easily determined; the width must be found by using your dividing point, as by 9. The rule for a dividing point being—to find your vanishing point, measure the distance from it to the station point, and lay that distance on the horizontal line, in parallel perspective the point of sight being the vanishing point. To give the inclined line to which the stairs vanish, use the rule given for the vanishing point of an inclined line, and draw an inclined line from 7 and 8, then use your square to give the perpendicular lines, and your vanishing point until it intersects the inclined line, which will give the width of the stairs. For drawing stairs down, put a measuring line, 1, 2, 3, 4, mark on it the height of the stairs, and draw to the vanishing point. The width of the stairs is determined by marking on the measuring line the width required, and by using the dividing point the desired width will be given in perspective.

Example 8.

For the vanishing point of an inclined line, find the vanishing point on the horizontal line, to which the inclined line would have been drawn if it had been horizontal. Pass a perpendicular line through that point, then continue the inclined line till it intersects the perpendicular. The intersection is the vanishing point required.



Example 9.

In order to draw a circle in perspective, it is necessary to enclose it in a square, so that the square being drawn in any position, the circle can then be placed in perspective. In Fig. 1 the square is not in perspective. The necessary intersections are given by a line from corner to corner, a line through the centre, horizontally and perpendicularly, dividing one side into seven. Draw a line at 2 and 3, which will give the intersection for the circle required.

Fig. 4 is drawn horizontally, and in parallel perspective. The point of sight in parallel perspective being the vanishing point, the dividing point must be used to obtain the line 5, until it intersects line 6.

For a dividing point, find the vanishing point of the line to be divided, measure the distance from it to the station point, and lay that distance on the horizontal line, measured from the vanishing point.

EXAMPLE 9.

Fig. 1.

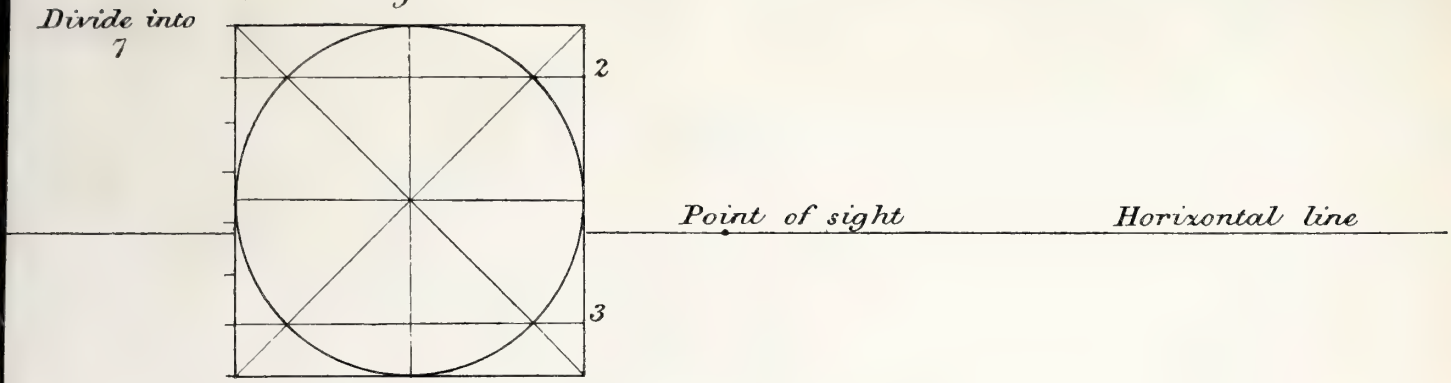
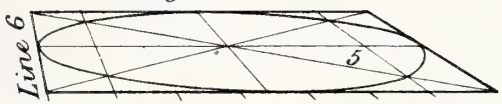


Fig. 4.



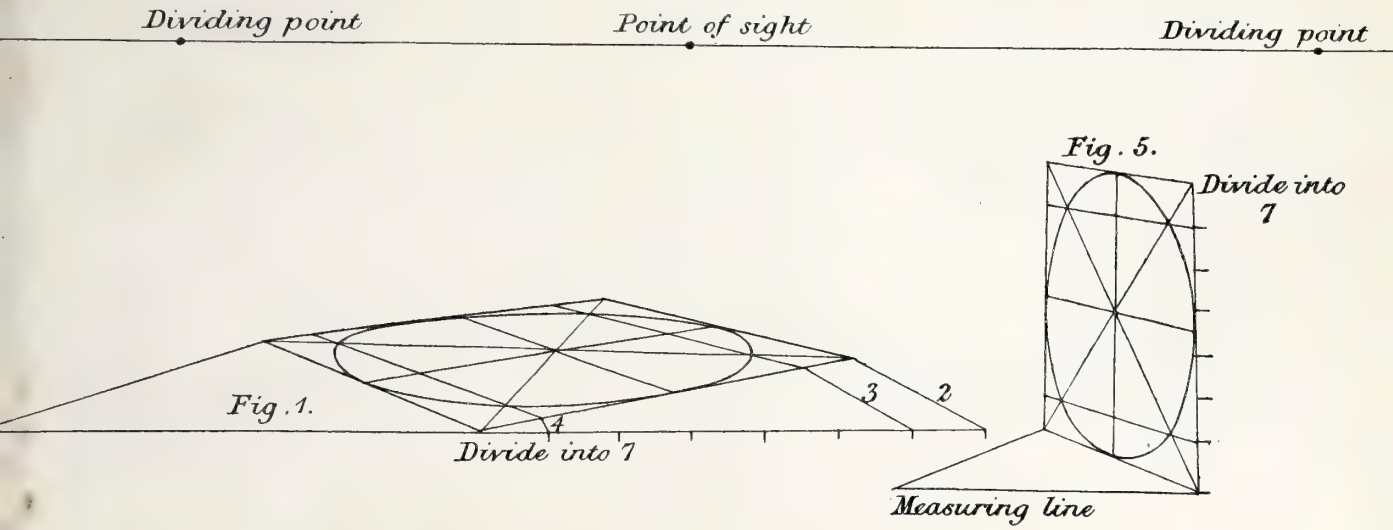
Example 10.

To turn a circle in perspective, the square which encloses it must first be drawn according to previous rules—namely, the horizontal line placed even with the height of the eye, the point of sight, station point, and vanishing points found, a measuring line put at the nearest corner of the square, as by Fig. 1, the right proportion marked on it, and the dividing point used to give lines 2, 3, and 4, which decides the 7th in perspective. A line from corner to corner, and through the centre, will determine the intersections through which the circle must be turned.

Fig. 5 is drawn by putting the square into perspective (by previous rules), and so obtaining the circle.

For a dividing point, find the vanishing point of the line to be divided, measure the distance from it to the station point, and lay that distance on the horizontal line, measured from the vanishing point.

EXAMPLE 10.


Dividing point
Point of sight
Dividing point
Fig. 5.
Divide into 7
Fig. 1.
3
2
4
Divide into 7
Measuring line

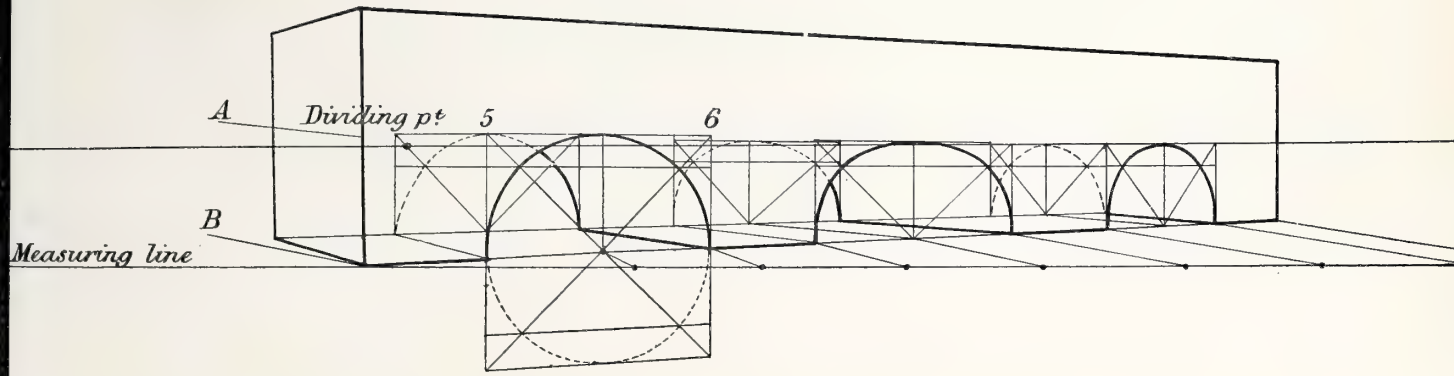
Example 11.

A bridge, consisting of a succession of semicircular arches, can only be rightly drawn when each arch is placed in by the rules of perspective. The bridge itself must therefore first be drawn by the same rule as Example 1. The height of the first arch must be decided, and marked on the nearest perpendicular line, from A to B. A measuring line must then be put at the base, and the required proportions marked on it. The width of each arch would be twice its height. Find the dividing point, and use it to carry the true size of the half square back to the model. Form a half square, as from 5 to 6. A line through the centre, and from corner to the centre, will give the necessary intersection. This must be repeated for each arch. It may be said that drawing the circles in perspective would take too much time in sketching from nature; but the knowledge of how to do them correctly would give a power of drawing them by eye at least more truthfully.

To carry the arch through to the other side of the bridge, use the two vanishing points, as by Example 11.

See the rule for finding a dividing point on the previous page.

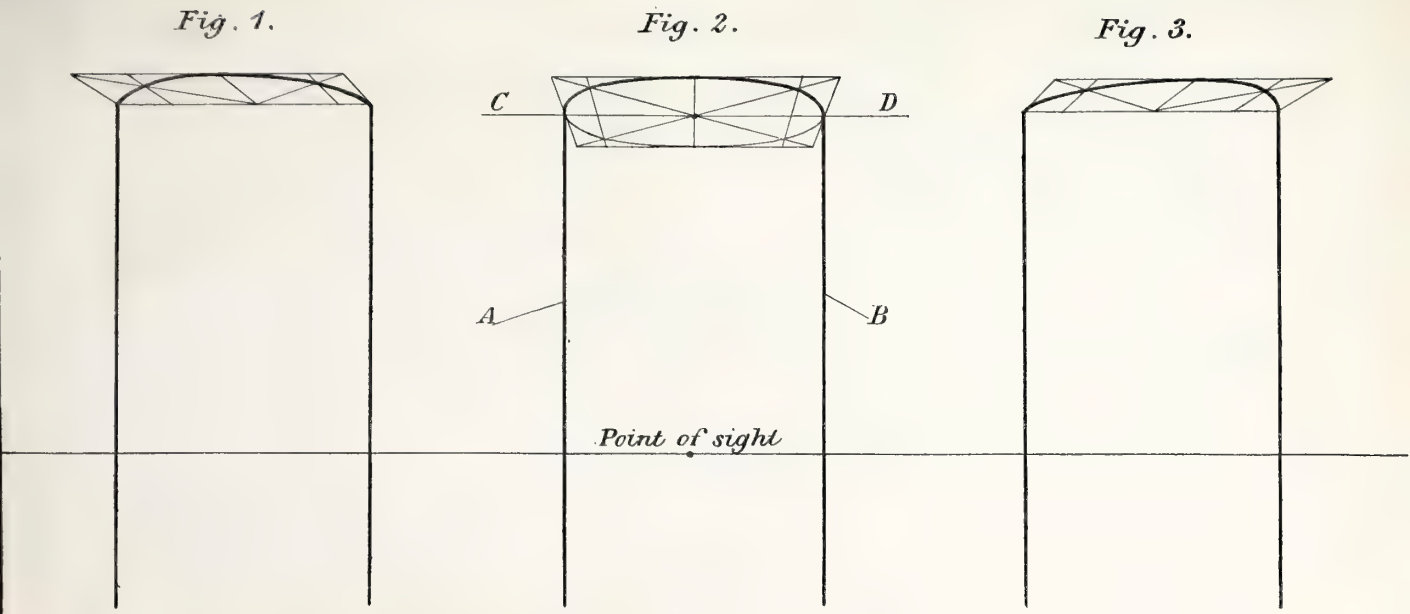
EXAMPLE 11.



Example 12.

To draw round towers, first determine the size of your picture, the horizontal line at the height of the eye, the point of sight in the centre of your picture, the station point, and the vanishing point, which in parallel perspective is the point of sight. Find the dividing point, by measuring the distance from the vanishing point to the station point, and laying that distance on the horizontal line. Draw the perpendicular sides of the tower, A and B, put a horizontal line from C to D, which will give the diameter; pass a line from the dividing point through the centre of that line, which will cut the sides of the square drawn from the vanishing point, and so decide the size of the square which encloses the circle. Complete the square, find the 7th (as by previous rules for circles), and draw the circle through the intersections, as by Fig. 2, Example 12. The same rule applies to towers not in the centre of the picture, which will appear true if the eye be opposite to the point of sight.

EXAMPLE 12.

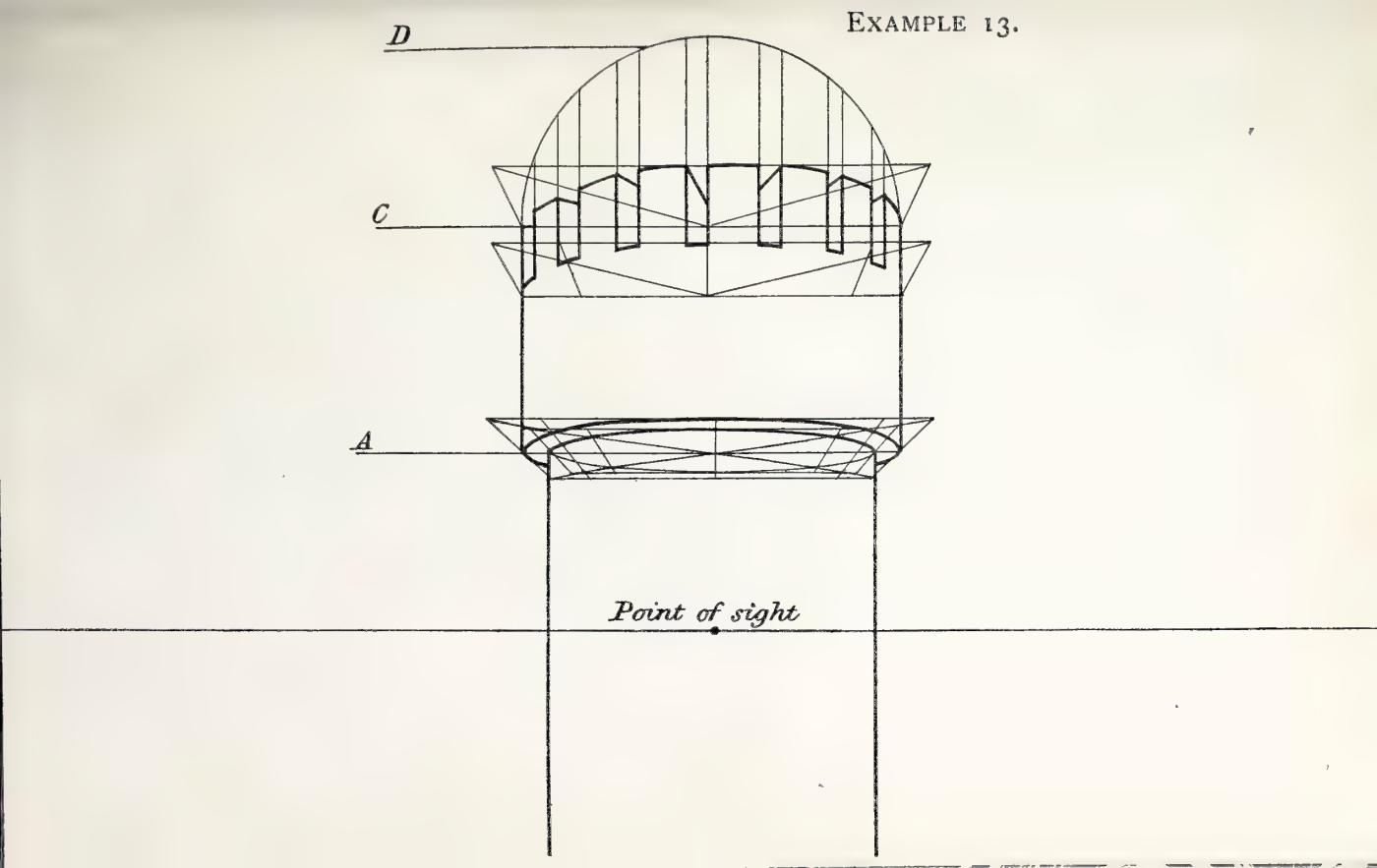


Example 13.

Draw the tower, and first half-circle, A, by rules on previous page. To obtain the second whole circle, form a new square removed from A the distance required, the horizontal line in the centre of the new square being the same as A, but extended as far as found necessary. Draw the crown of the tower, C; find the half-circle for the base of the turrets by previous rules.

To draw the turrets in perspective, put a circular measuring line, D, mark on it the proportions required, and use them as by Example 13. The thickness of the turrets to be drawn to the centre of the line, C. The circular measuring line would be the same if the towers were placed to the right or left, for since the squares forming the intersections for the circle are in parallel perspective, the circular measuring line would be so also.

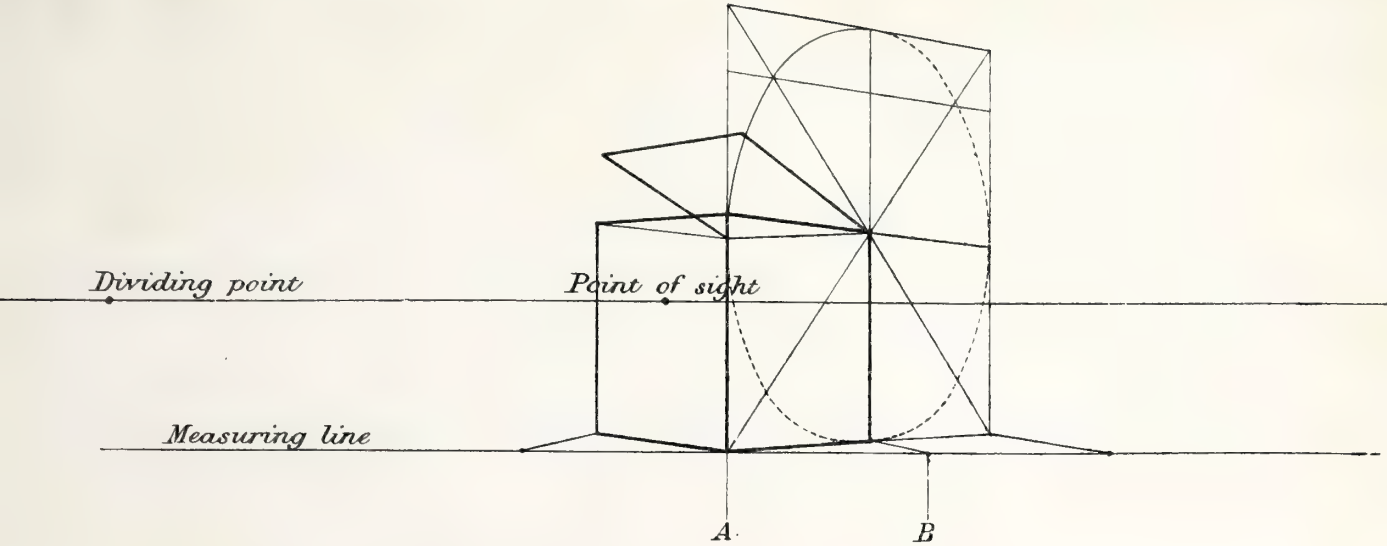
EXAMPLE 13.



Example 14.

Draw a box by previous directions, Example 1. For the vanishing point of the inclined line given by the open lid, find that vanishing point on the horizontal line to which the inclined line would have been drawn had it been horizontal. Pass a perpendicular line through that point. Then continue the inclined line until it intersects the perpendicular. The intersection is the vanishing point required. For determining the fourth of the circle on which the lid moves from the hinge, place the size of the side of the box the lid fits (taken from the measuring line) A to B. Draw the quarter-square as by Example 14: the quarter-circle thus obtained will decide the determination of the inclined line of the lid. For giving the further inclined line, draw the top of the box as seen through, which will decide the hinge from which the inclined line starts. Draw the inclined line to the vanishing point found for the inclined lines; for since all lines parallel continue their course to the same point, the vanishing point would be the same as the first inclined line was drawn to.

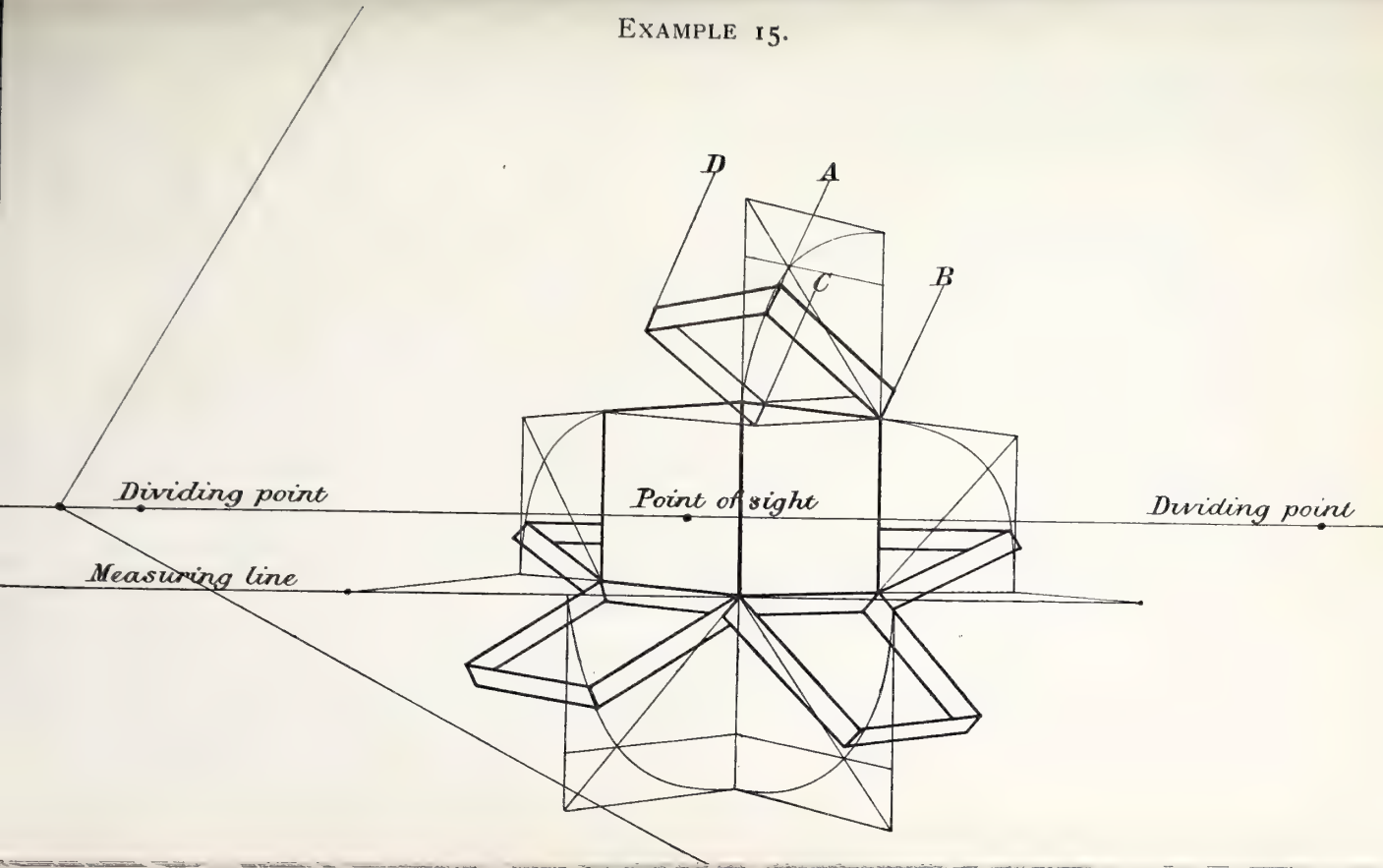
EXAMPLE 14.



Example 15.

First draw a cubical box, as by Example 1. Draw the inclined line as by directions on the previous page. For the thickness of the lid of the box, A, B, C, D, find that vanishing point on the horizontal line to which the inclined line would have been drawn had it been horizontal; pass a perpendicular through the point, B, then continue the inclined line, until it intersects the perpendicular. The intersection is the vanishing point of the inclined line of the lid. For the thickness, continue that line from the vanishing point of the inclined line until it meets the horizontal line. A right angle at that juncture carried back on to the perpendicular line, will give the vanishing point required for the thickness of the lid drawn in any position. Example 15 is to show the use of the circles in deciding the length of the inclined line of the lid of a box. The knowledge of the laws respecting circles is invaluable in drawing the domes of cathedrals, round towers, water-wheels, the length of the sails of mills, or wherever a true circle is needed; and, in interiors, for round tables, bowls for flowers, vases, &c. &c., which cannot possibly be truly drawn without these laws.

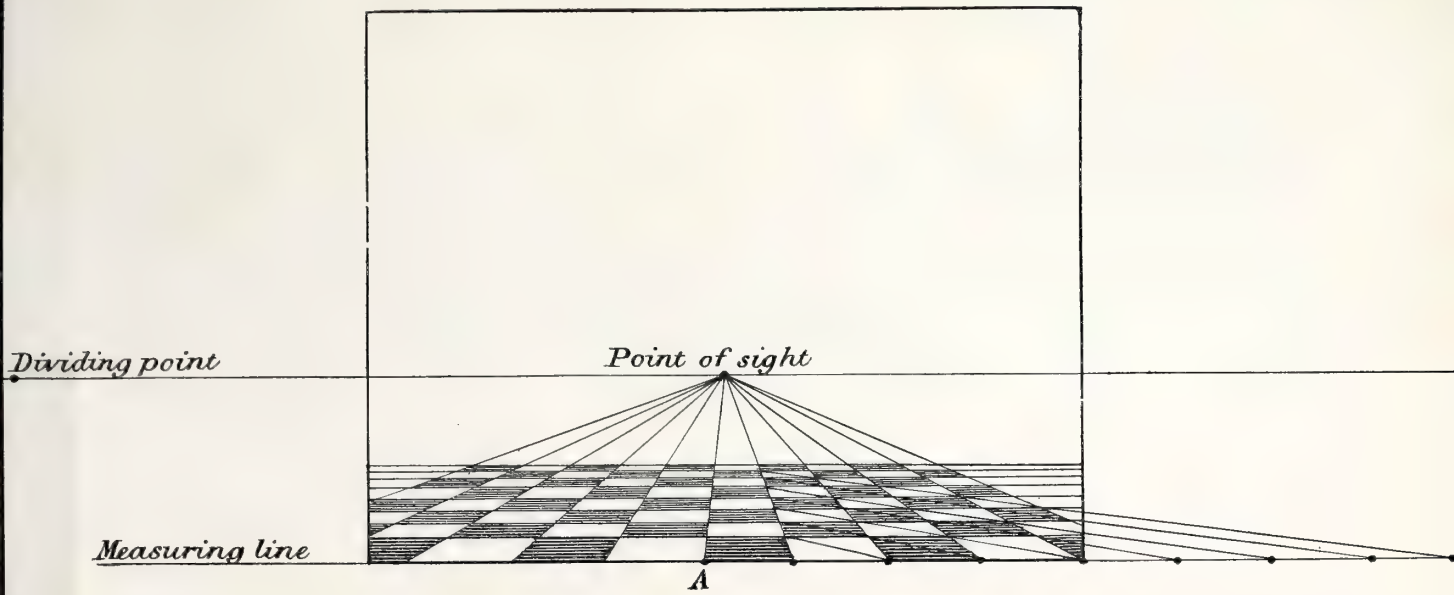
EXAMPLE 15.


D
A
C
B
Dividing point
Point of sight
Dividing point
Measuring line

Example 16.

A floor cloth of alternate light and dark squares must be placed in by the same rule as Example 1—namely, to decide the size of the picture, the horizontal line, point of sight, which in parallel perspective (as Example 16) becomes the vanishing point. Find the dividing point by measuring the distance from the point of sight to the station point, and laying that distance on the horizontal line, measured from the point of sight. Draw the square that is nearest A by the vanishing point, and measure on the measuring line the size your squares are to be. Repeat that size on the measuring line for as many squares as your floor cloth requires, then use the dividing point to the squares in the centre of your picture, which will give the retiring size of each square in perspective. Horizontal lines continued from these squares will decide all the others.

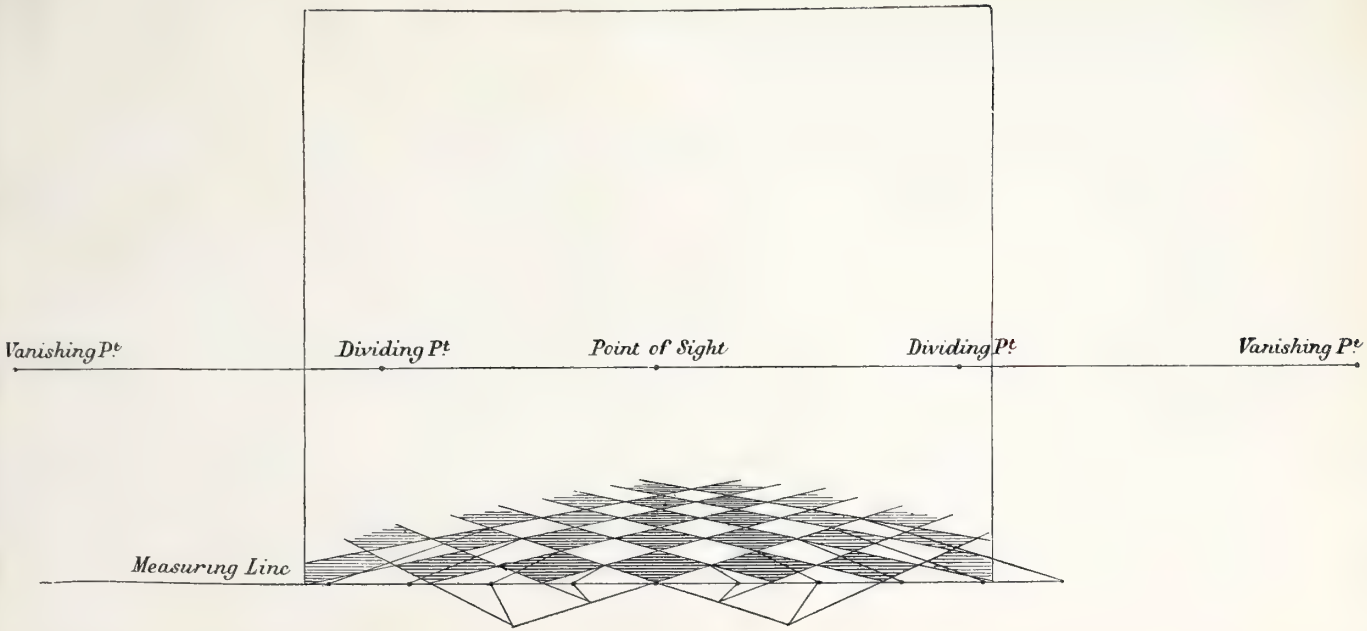
EXAMPLE 16.



Example 17.

The floor cloth in Example 17 is not in parallel perspective, but each square having its two vanishing points. The first square must be drawn with the use of the dividing point to obtain the true square in perspective ; the horizontal line at the base of the picture, being the measuring line on which the size of the square first drawn, and the others in succession, are determined by the use of the dividing points. Use alternately the vanishing points and dividing points. One line of squares being found will give all the rest, drawing with the dividing point from the measurement on the measuring line. The above rule is useful in placing the pattern of a carpet, or tesselated pavement, &c. &c.

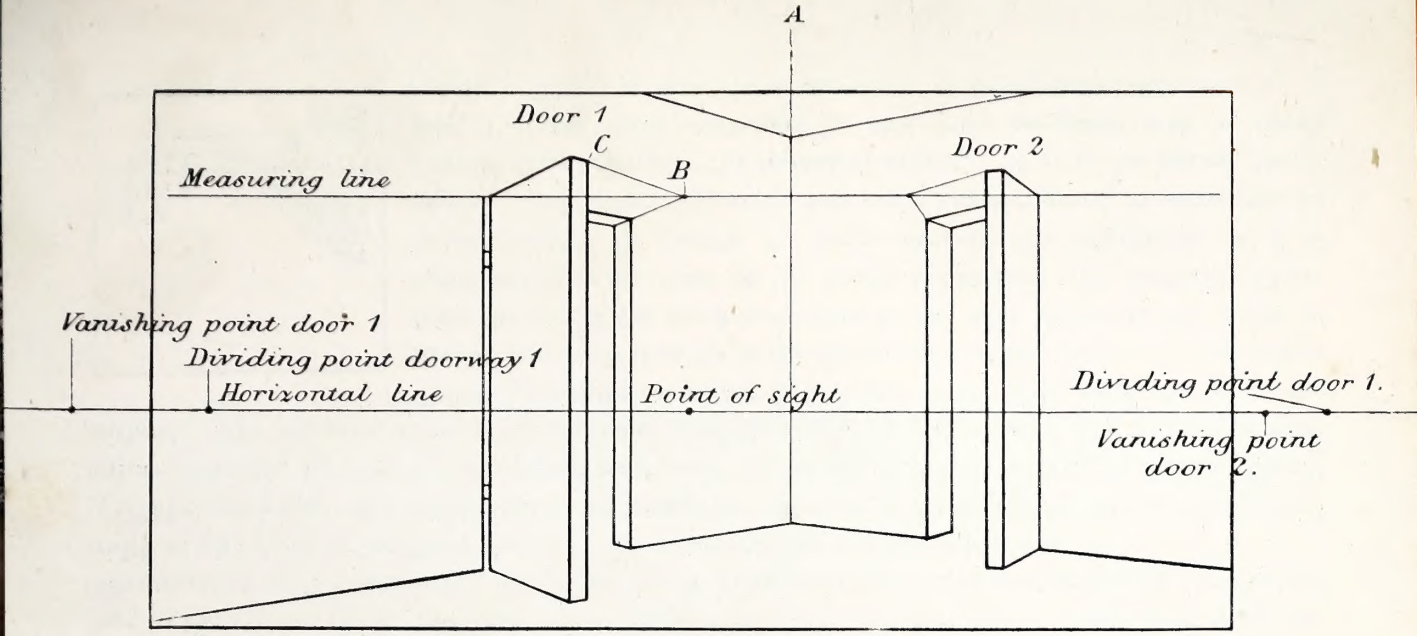
EXAMPLE 17.


Vanishing Pt
Dividing Pt
Point of Sight
Dividing Pt
Vanishing Pt
Measuring Line

Example 18.

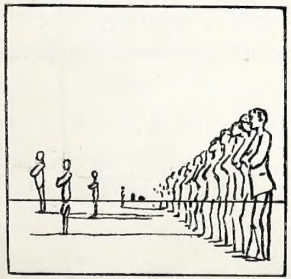
In drawing an open door, it is necessary that it should be of such a size, that when closed it will fit the doorway. The following simple rule will make this easy:—First, draw the perpendicular line, A; by its length, decide the height of the eye, the horizontal line, point of sight, which must be in the middle of the picture and on the horizontal line. Next, the station point, placed at a distance equal to the length of your picture from the point of sight: place the ruler at the station point, parallel with one side of the room you intend to draw, and where it intersects the horizontal line is the vanishing point of the side of the room. The vanishing point for the other side of the room is given by taking a right angle at the station point from the first vanishing point, and where it cuts the horizontal line decides the second vanishing point. So far, it is exactly the same as the rule for drawing a cubical box (Example 1). For the doorway, draw it the size it appears in nature, pass a measuring line through the hinge, and find the dividing point of the doorway by measuring from its vanishing point to the station point, and laying that distance on the horizontal line. Then draw a line by the dividing point, from the corner of the top of the doorway to the measuring line, which will give the true size of the doorway on the measuring line. Then take a fresh vanishing point on the horizontal line for the door, and by it draw the top and the bottom of the door; and for the length of these lines, find the dividing point of the *door*, by measuring from the vanishing point of the

EXAMPLE 18.


A
Door 1
C
B
Door 2
Measuring line
Vanishing point door 1
Dividing point doorway 1
Horizontal line
Point of sight
Dividing point door 1.
Vanishing point door 2.

door to the station point, and laying that distance on the horizontal line. Then draw from the measurement on the measuring line B, by the dividing point to C, and that will give the desired width of the door, as by Example 18. The same rule applies to both doors.

The foregoing rules will be found to comprise all that is most needed in sketching from nature, whether for interior or outdoor work, and can be adapted to much that is found difficult without. For instance, there is perspective needed in giving the size of figures in a picture.



Take the height of a man to be eight heads high, place the figure the height you wish it to be in the foreground of the picture; a line taken from the top of the head and again at the feet, drawn to the point of sight, will give the size of the figure throughout the picture. There is perspective in clouds, in trees—indeed, the adaptation of it is endless, and unless the artist has some knowledge of its principles he cannot draw truthfully the humblest object. It is to be hoped, therefore, that the rules contained in this little pamphlet may be found helpful. They, at least, have the merit of being easy and true.